

## CLAIMS

1. An electron beam exposure apparatus comprising electron beam irradiation means, means for holding an irradiation-target substrate, and means for holding a 1:1 mask to be placed near said irradiation-target substrate  
5 between said electron beam irradiation means and said irradiation-target substrate, said electron beam exposure apparatus characterized in that said means for holding said irradiation-target substrate and said means for holding said 1:1 mask hold said irradiation-target substrate and said 1:1 mask substantially vertical, respectively.
- 10 2. An electron beam exposure apparatus according to claim 1, characterized in that said means for holding said irradiation-target substrate and said means for holding said 1:1 mask keep said irradiation-target substrate and said 1:1 mask substantially parallel to each other.
3. An electron beam exposure method for irradiating an electron beam  
15 from electron beam irradiation means onto an irradiation-target substrate through a 1:1 mask in a pattern determined by said 1:1 mask, said electron beam exposure method characterized by arranging said irradiation-target substrate and said 1:1 mask substantially vertical, respectively.
4. An electron beam exposure method according to claim 3,  
20 characterized by using, as said 1:1 mask, a mask having a thin membrane in which at least part of a beam of a pattern portion of the mask is omitted.
5. An electron beam exposure method according to claim 4, characterized by using the 1:1 mask comprising the thin membrane having no beam at the pattern portion.
- 25 6. A semiconductor device manufacturing method characterized in that said irradiation-target substrate is a semiconductor wafer and by comprising at least a process of exposing said semiconductor wafer by the use of the electron beam exposure apparatus according to claim 1 or 2.

7. A semiconductor device manufacturing method characterized in that said irradiation-target substrate is a semiconductor wafer and by comprising at least a process of exposing said semiconductor wafer by the electron beam exposure method according to any one of claims 3 to 5.

5           8. An electron beam exposure apparatus comprising a 1:1 mask and an irradiation-target substrate arranged so as to face said 1:1 mask, said electron beam exposure apparatus characterized in that said 1:1 mask and said irradiation-target substrate are arranged so as to be parallel to a gravity direction.